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A VISIT TO FERNANDO DO NORONHA.

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On July 9th, last year, the writer and Mr. G. A. Ramage, of Edinburgh, started by the Royal Mail steamer from Southampton for Pernambuco, in order to explore the island of Fernando do Noronha, the Brazilian penal settlement, situate nearly 200 miles east of Cape San Roque. The voyage to Pernambuco occupied fourteen days, the weather being very calm. Nothing of note in a Natural History way occurred during the voyage, excepting the appearance of a small whale in the Bay of Biscay, perhaps one of the last of the Biscay Whales, *Balæna biscayensis*, and when nearing Fernando do Noronha, which we passed at night, a Noddy, *Anous leucocapillus*, flew on board, very wearied, and remained on the ship for a day. Storm Petrels followed the vessel for a couple of days after leaving Portugal, and then disappeared. On arriving at Pernambuco we were met by the Rev. T. S. Lea, an enthusiastic naturalist, who was to join the expedition, and there learnt that the 'Giquia,' a little steamer that plies monthly between Pernambuco and Fernando do Noronha, was to sail on August 10th. We had consequently some time to wait, and occupied the interval in preparing for the expedition and in making excursions in the neighbourhood of Pernambuco. These excursions would have been more extensive had it not been for the irritating stupidity and "red-tapism" of the Brazilian Custom House officials. Under the regulations of the Custom House all books and apparatus used in the exploration of any part of Brazil are

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exempt from duty, and one would have thought that nothing would have been simpler than to get our collecting apparatus through the Custom House at once. But no, it was obvious, they said, that the apparatus was for collecting purposes, and was therefore free of duty, but "did it belong to us?" In vain we showed a letter from the Brazilian Ambassador to the President of the province, and pointed to our names on the boxes; we must get a letter from the President himself. On asking this gentleman for a letter he replied politely that *he* had nothing to do with the Customs, and would not even give us a letter to say that we were the party of explorers to whom the articles in question belonged. After some days were spent in endless discussions in which all manner of absurd objections were raised, the Customs' officers, wearied of the matter, agreed to pass the boxes if we got a letter from the Consul, as we had offered to do on the first day of our application. This was accordingly obtained, and the boxes were free, only one other objection being raised—namely, that it was against the rules for the British Consul to write an official document to the Custom House in any language except English, while it was equally impossible for the Custom House officials to receive it if it was not in Portuguese. It must go to the Public Translator to be translated into Portuguese, and he would translate it in a week, before which time our steamer was timed to start! However, a happy suggestion, that it might do as well if the boxes were freed first and the translation made afterwards, was fortunately accepted, and all ended well. But this provoking incident almost entirely prevented our doing anything in the way of collecting for a week, and will give an idea of the annoyance to which a naturalist is liable on his arrival in that country. Even then our difficulties were not over, for a letter to the Governor of Fernando do Noronha, some days after we had discussed the matter with him, suddenly discovered that he had never heard of the expedition *officially* from the Government at Rio de Janeiro, though he had been in correspondence with the Government there since the previous May! This fresh difficulty necessitated telegraphing both to England and to Rio, and when this was finally settled it was nearly time for the boat to start! On the 10th of August we had everything on board, and the steamer was to start in a few hours, when the President telephoned to say that he did not wish the boat to leave for ten days! We were in despair, but a certain Captain Roma, who was going to work and export guano from Fernando do Noronha, having persuaded Captain Farrell, of the 'Nasmyth' (a steamer trading to Liverpool), to take him and some of his men to the island, kindly introduced us to Capt. Farrell, who took us also on board, and in two days we were landed on Fernando do Noronha. Here we were well received and housed by the Director of this group of islands, and at once began the work of exploring and collecting.

The islands form a chain of about eight miles long, the most western of which is the largest, and here is the establishment of convicts, 1400 in number. The other islands are not inhabited, with the exception of Rat Island, the most eastern of the group, where there is the immense deposit of guano, which is being worked by Captain Roma. The main island has a rich vegetation of creepers and other plants, with dense wood at the further end, although there are no trees of large size. This district is called the Sapate. The whole island is both hilly and rocky. The cliffs of basalt are draped with a dense growth of Cactus and other plants, and near the village rises the Peak, a lofty rock of phonolite, inaccessible even to the boldest alpine climber, and the nesting-place of the Tropic-bird, *Phæton æthereus*, one of the most conspicuous and beautiful birds to be found here.

When the island was first discovered by the Portuguese sailor whose name it bears it was tenanted by immense flocks of sea-birds, and it was the sight of these that led to its discovery. They have now well nigh disappeared, although not from extermination, and all that remains to indicate their former abundance is the immense deposit of guano, estimated at two million tons, on the two easternmost islands. Perhaps the commonest bird here is the Noddy, *Anous leucocapillus;* it nests on the cliffs in many places, and in the Sapate, where there are two or three colonies of them in the trees. They live chiefly on the Sardinha, a small and excellent fish which occurs in large shoals near the shore. A young Noddy was brought to me, taken from the nest, and I endeavoured to rear it, but it very soon died. The convicts were skilful at snaring these sea-birds, and brought us besides live Boobies, *Sula fusca*, and Tropic-birds. The Boobies are likewise very common, and may often be seen diving from a considerable height into the surf for Sardinhas. They nest on the cliffs at Egg Island, and also on St. Michael's Mount. The

Frigate-bird, *Tachypetes aquila,* is constantly to be seen soaring at a great height over the sea. It only nests, as far as we could see, on the higher parts of St. Michael's Mount. We saw one suddenly dart to the ground on the sand-hills at the eastern end of the mainland, and hastened to see what it was attempting to catch, but on our approach it rose and sailed away, bearing the dry stem of a convolvulus in its beak, which was doubtless destined for its nest. On one or two occasions a small species of Albatross was seen, but not near enough to identify it. The beautiful White Tern, *Gygis candida,* the "Viuva branca" of the Brazilians, frequents certain parts of the island. Elsewhere, as for instance in the Keeling Islands, this bird deposits a single egg on the base of a leaf of the cocoa-nut palm. Here, however, it was laid on the branch of one of the native trees, although there were plenty of cocoa-nut trees at hand. As these were comparatively recently introduced, however, it had probably not learnt to take advantage of them. It was very curious to see this bird nesting (if one may call it so) in the middle of a tree absolutely devoid of leaves; but this was a not uncommon proceeding also on the part of the island Dove, *Zenaida noronhæ,* which takes no pains to conceal its nest. The fact is these birds have no enemy to fear except tha rats, which cannot conveniently creep along the slender branches on which they place their nests. The White Tern, like the Noddy, also formed colonies in the Sapate, and were more commonly seen flying over the woods than near the sea.

Besides the species already named there are also several land-birds. A Tyrant—which looks very much like a hen Chaffinch at a little distance—proves to be a new species. It is very common all over the island, and good specimens were shot in the Governor's garden. Its nest is placed in a tree, and somewhat resembles that of a Chaffinch in shape. It was made of the silky pappus of a curious Asclepiadaceous plant peculiar to the islands. This bird had hardly commenced to breed when we were on the island, but we found one nest with a single egg in it, on St. Michael's Mount: unfortunately, in endeavouring to get the nest, which was in a most inaccessible spot, the egg fell out and was broken. It was white, with large dark red blotches.

Another common bird here is a Greenlet (*Vireo*), which frequents the cashew-nut tree and the cocoa-nut palms. It is a small green bird, like a Willow Wren, very active, but by no means difficult to shoot. We never succeeded in finding its nest. The dove above mentioned was particularly abundant and tame. It makes a small nest of sticks lined with roots, in the branches of trees, in which it deposits two white eggs. Specimens of the nest, with eggs, on the entirely bare branches of the burra-tree, a curious endemic tree, were brought home, and are now in the Natural History Museum. This dove is found on all the islands large enough for it, and flies from one to the other. It has, I believe, played an important part in the distribution of plants in the islands. The crops of the specimens we shot were often crammed with seeds of the small wild melons, which are abundant on the islands, and we found them very excellent eating. The convicts often keep these birds in cages. They have rather a harsh note, that seems disproportionately loud for the size of the bird. One specimen that was shot on the nest, in order to prove a certain point, was found to be a male.

Towards the end of our stay on the island, some small wading birds made their appearance. A pair, about the size of Curlews, were seen on the sand-hills. They were very wary, and it was with difficulty that Mr. Ramage got a shot at them, but they were almost out of range and escaped, going out to sea. On the same day a Sandpiper of some kind was seen at a small pond, made for the goats to drink at, near the same sand-hills; but it was disturbed by a convict, and flew to the shore, where we made an unsuccessful attempt to stalk it. It is very possible that these birds had come across from the mainland, which might account for their shyness.

There are no indigenous Mammalia on the islands. The Black Rat, which has been introduced, is exceedingly abundant and destructive, climbing the cocoa-nut palms and papaw-trees and devouring the fruit, and haunting the melon patches, where it does much mischief. Equally abundant is the common Mouse, which is so tame that it may sometimes be caught in the hand, and quite easily with a butterfly-net; they live on the seeds of the Cassias and other *Leguminosæ* which abound in the island, and I have seen one on the very top of a flower-spike of *Crotolaria*, a kind of yellow lupin, the seeds of which it was nibbling. It is this animal—and not the Rat—that has given the name to Rat Island, which is a translation of the Portuguese

Ilha de Ratta, *ratta* being Portuguese for both rat and mouse. Albinos of both species occur, but those of the former are rare. Once a month the convicts have a *battue* of rats and mice, certain men having to bring in fifty a-piece. They go out with dogs and sticks, and at the end of the day the slain are displayed in a large pile. One of these hunts took place while we were on the island, and three thousand nine hundred and odd rats and mice of all sizes and ages were placed in a heap in the square after the evening service. This was a tolerably good capture for that time of year; but in the dry season, when the vegetation is all burnt up, and both food and shelter are scarce, the animals are easier to catch, and as many as twenty thousand have been caught in one day. The domestic cat has run wild in some of the islands. There was one on Rat Island which had escaped from an Italian vessel wrecked there, and was living on the mice and doves.

It is curious that no Bats occur on any of these islands, although they are so abundant on the neighbouring mainland. There are three species of terrestrial reptiles—a Skink, *Mabuia punctata;* a new species of *Amphisbœna;* and the Common House Gecko. The Skink is very common, and occurs on all the islands; it is about six inches in length, and of an iridescent-brown colour; it is very tame, and if the observer remains motionless will approach very close: it is apparently omnivorous. On one occasion when I had blown some doves' eggs, a Skink ran forward and drank up the yelk; another time, on throwing away the skins of some bananas we had been eating, the lizards ran up and carried them off, or ate them on the spot. The *Amphisbœna* lived under stones and in the soil, as is the general habit of these animals; a number were found in digging sweet potatoes on Rat Island. The House Gecko was very common in the houses, where it did good service against the mosquitos, and it also lived during the day between the petioles of the bananas. We found its eggs on one or two occasions, either lying loosely on the ground in the garden or in a hole in the stem of a papaw-tree: they were perfectly globular and white, about the size of a pea, and rather large for the size of the animal.

Turtles were sometimes to be seen in the quiet sandy bays, lifting their heads from time to time out of the water; they are not eaten here, but their eggs are much sought after at the breeding season, certain bays being more frequented than others by the females. The sea swarms with fish of all sizes, forms, and colours; in fact, the islands have been known as a good fishing-ground for nearly two hundred years. The convicts employ much of their time in fishing from the rocks and from little catamarans. Among the most conspicuous fish are those of the genus *Muræna*. which attain an immense size; one of the biggest we saw was black, and about ten feet long, much resembling a large eel. There is said to be also a blue one. A black and yellow one of comparatively small size, and not eatable, was often caught under stones. One day two boys caught an immense *Serranus*, as large as a good-sized pig: it was sold for about seven shillings. Sharks are very common round the island, but do not attack the bathers. On one occasion we saw a very fine White Shark, about thirteen feet long, cruising about under a rock from which a convict was fishing, much to the latter's annoyance, as it was devouring the fish attracted by his bait. Some very large Rays used to frequent the bay at the foot of the Peak, where we used to bathe; they would come in quite close to the shore, and their presence was announced by a rush of small fish on to the sand, seeking to escape them. They never molested us, though on one occasion one came within a few yards of me as I was swimming in the surf. The convicts harpoon them.

The rock-pools swarm with fish of many colours—crimson, red, blue and orange, grey, black, yellow. Of these we caught a considerable number, partly with a hand-net, and more easily by the unsportsmanlike but eminently satisfactory process of beating up with a club the stem and roots of a wild vetch with silky grey leaves and pink flowers, and stirring up the rock-pools with the fragments. The result of this was that the fish became stupefied and were quickly caught. It not only saved a great deal of time, but also enabled us to procure many fish which at low tide lay hidden in crevices of coral in the rock-pools, and would otherwise have been quite unprocurable. Of course the pool was only spoilt for fish for one day, for the next tide would wash out all traces of the poison vetch.

The coral-reef, it need hardly be said, abounds also in invertebrate life. Mollusks are plentiful; Chitons, Mussels, Cones, Limpets, Trochi, and many other beautiful shells were obtained. One species of Cuttle-fish is very common, and possesses a marvellous power of alteration of colour. It frequents the rock-pools, and is hunted by the convicts, who on catching it turn the mantle inside out and tear off the ink-bag; it is then dried, and makes an excellent soup when boiled. Several species of *Echinodermata* were taken, but no novelties. A *Cidaris* was common, and so was a beautiful *Echinus*, which sometimes almost filled up a small rock-pool, so closely were the animals crowded together. Several Star-fish were also caught. Among the Crustacea, a small blue Cray-fish and several species of Crab proved excellent eating. One kind of Crab is exported to Pernambuco, in wooden boxes filled with dry leaves, where it fetches a large price. The convicts are very skilful at cleaning out the insides of these Crabs and Lobsters, and stuffing them to make Natural-History specimens. A species of *Grapsus* abounds on the rocks, keeping just above the sea-water, usually green and grey, but it was sometimes ornamented with brilliant red. It is very active, and can leap from stone to stone in an astonishing manner. There is also a white Crab which lives in burrows in the sand, and when dug out runs rapidly on the extreme tips of its hind claws in a most ridiculous manner.

Of the lower animals, Sponges of all colours, Corals green and brown, two kinds of Sea Anemone, one large claret-coloured species, and another smaller, of a dull red, were met with. Worms also are tolerably numerous, and many were obtained by breaking up the reef with a hammer. The most objectionable was a splendid scarlet worm, about four inches long, ornamented with large tufts of white bristles on the sides and back. When touched these bristles, like thread of blown glass, enter the skin and sting horribly, the effect lasting for a couple of hours. The natives call it the "Lagarticia do Mar."

Among the terrestrial invertebrates collected were one small Scorpion and two or three Myriopods, including a large Centipede which usually lived under cow-dung and stones, but sometimes invaded houses, and bites rather badly. Amongst several kinds of Spider, one of large size and nocturnal habits plays havoc with the large American Cockroach, which also frequents the houses. Several species of land Mollusks were obtained, one being a curious new *Bulimus*. Lepidoptera were rare: one species of butterfly, a small blue one known also from Brazil, was common. A few Noctuæ, Geometers, and Pyrales were also taken. Beetles were not common; it was probably too early in the year, but a number of specimens of a curious grey Longicorn flew to the lights, and several smaller kinds were taken. Some large brown and green Grasshoppers made a great noise at night; and a peculiar black and brown Field Cricket, inhabiting the fields in the middle of the island, was very common. The most important Hymenopterous insect collected was the *Marimbondo*, a small brown Hornet, which makes little pendulous nests containing about a dozen cells, hung from the underside of a slab of rock, or, more commonly, to the branch of a tree; the cashew-nut tree is an especial favourite; I have seen one full of nests in all stages of structure. The *Marimbondo* can sting a little, but is not so bad as an ordinary wasp. Together with a small black Bee it plays an important part in the fertilization of the plants of the island as so many of these belong to the orders *Leguminosæ* and *Cucurbitaceæ*, of which a very considerable proportion require the aid of Hymenopterous fertilization.

After six weeks' residence on this island, we embarked in the little trading steamer, and after a tedious and uncomfortable passage of three days we arrived at Pernambuco, where, the mail-steamer having just left, we were obliged to wait for another fortnight. A part of the time we remained at the little village of Iquarassa, twenty-one miles north-east of Pernambuco, where there is a fine field for zoological and botanical collecting. Here we left Mr. Ramage to pursue the study of Natural History, in the dense forests and open heaths of this part of Brazil, and returning to Recife, caught the mail-steamer, and arrived in England in the beginning of November, to find that all the collections made in Fernando do Noronha and Pernambuco were safely housed in the Natural History Museum.

PEARLS AND PEARL FISHERIES.

By M. Weber.*

Many Mussels cover the inside of their shell with a layer consisting of animal membranes and carbonated lime. Thereby a peculiar lustre is produced on the inside of the shell, which is called "mother-of-pearl." A smaller portion of this secretion often forms excrescences shaped like drops or kidneys, which either are imbedded more or less firmly in the inside of the shell, or lie loose in the soft parts of the animal, especially in its so-called "beard." These are what are generally known as "pearls."

The formation of mother-of-pearl is no doubt a natural process taking place in certain Mussels. The formation of pearls, on the other hand, is ascribed to accident, and probably is caused by a sickness of the Mussel, or by some wound inflicted on it. This view has been reached by noticing the circumstance that, when the shells are large, and the inside smooth, clean, and without holes, so that the mollusks can fully develop, pearls are but rarely found; while the formation of pearls is very frequent when the shells are irregular. Sometimes hundreds of pearls are found in the last-mentioned shells; but frequently scarcely one of them possesses any commercial value.

Real pearls are found only in bivalves; but a useful product is found in some univalves. The products of the following species are known in commerce:—

(1) *Avicula margaritifera.*—Which produces the most valuable pearls, but whose shell is worthless.

(2) *Meleagrina margaritifera.*—Principally valued on account of the mother-of-pearl. The shells are often 6 to 18 inches long. Its pearls are also of great value.

(3) *Strombus gigas.*—The conch-shell of the West Indies.

(4) *Tridacna gigas.*—The Giant Clam, with open white pearls of a subdued lustre.

(5) *Pinna squamosa.*—With black and red pearls.

(6) *Placuna placenta.*—Translucent, with lead-coloured pearls.

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* "Om Perler og Perlefiskerierne." From the 'Norsk Fiskeritidende,' Bergen. Translated from the Danish by Herman Jacobson (Bull. U.S. Fish Commission, 1887, pp. 321—328).

(7) *Ostrea edulis.*—The Common Oyster.

(8) *Modiola vulgaris.*—The Horse Mussel.

(9) *Turbinella scolymus.*—The Chank-shell; pale-red pearls.

(10) *Turbo olearius marmoratus.*

(11) *Turbo sarmaticus.*

(12) *Haliotis* (different varieties).—Found in the North Sea, New Zealand, the Cape of Good Hope, and Japan.

(13) *Anodouta herculea.*

(14) *Alamodon, Unio, &c.* — Found in Scotland, Ireland, Lapland, Bohemia, Bavaria, Saxony, and Canada.

The sea-pearl fisheries are principally confined to the Persian Gulf, the coasts of Ceylon, the Eastern Archipelago, Australia, the lagoons of many islands in the Pacific, and to Central America.

Fresh-water pearls have, as a rule, but little lustre, and are consequently of no great value; although one occasionally finds pearls having a value of from 50 to 70 crowns (13·40 to 18·76 dols.), and sometimes, 1800 crowns (482·40 dols.). For awhile the Scotch pearls enjoyed a great reputation. From 1761 to 1764 more than 180,000 crowns' (48,240 dols.) worth of pearls are said to have been brought to London from the rivers Tay and Isla. During the dry summer of 1862 a surprising quantity of pearls was found in Scotland. The average value of these pearls varied between 40 and 45 crowns (10·72 to 12·06 dols.), but those valued at 100 crowns (26·80 dols.) were also quite frequent. Statisticians estimate that the total value of pearls found in Scotland in 1865 was 216,000 crowns (57,888 dols.). Since that time pearls have advanced considerably in value.

During the summer months the Arabs carry on a sort of pearl fishery on the coast of the Red Sea. They catch the mollusks and lay them in the sun, so that they may open quickly. Jedda is the principal place where these fisheries are carried on. The exportation of mother-of-pearl from Jedda *viâ* Alexandria annually amounts to 1,200,000 pounds avoirdpois, half of which quantity goes to Birmingham.

The pearl fisheries in the Persian Gulf, especially on the coasts of the Island of Bahrein, are also in the hands of the Arabs. The best beds are said to be on fine white sand and in clear water. Nearly 5000 boats are employed in these fisheries, and their annual value is estimated at 1,080,000 crowns (289,440 dols.). Beds of pearls are found at various depths as far down as eighteen fathoms. The general depth at which they are found is, however, from four to eight fathoms. The season lasts from April to September. Most of the shells are brought to the little harbour of Lingah; thence a considerable quantity of mother-of-pearl is shipped direct to London, only a small quantity going to the continent of Europe. Many pearls, especially those of a yellow colour and those having a complete cone-shape, are sent to Bombay. Bagdad is a considerable market for white pearls. The shells which come to England from Persia are mostly small and have a subdued lustre; but, as a rule, they have higher prices than the Panama and Tahiti shells. The annual quantity imported is rarely less than 300,000 pounds. The total value of the pearls exported from the Persian Gulf during 1879 was 7,500,000 crowns (2,010,000 dols.).

The Ceylon pearl fisheries are carried on on the west coast of Ceylon, in the Gulf of Manaar, south of the island of the same name, and also on the west coast of India, near Tuticorin. The beds lie in groups. One of these is opposite the town of Arippu, and comprises the so-called Paria-par, Paria-par Karai, Cheval-par, Kallutidel-par, and Modaragam-par. The famous Karaitivu bed is opposite the town of that name. Other well-known beds are the Karakupanai-par, and the Jekenpedai-par. All these beds lie at a distance of at least six to eight miles from the coast, and at a depth of five and a half to eight and a half fathoms from the surface. They have a rocky bottom protruding from the sand, and are exposed to the currents of the sea. The beds are under the supervision of an inspector appointed by the local government, which has the exclusive working of them. The labourers and divers are natives, who as wages receive 25 per cent. of all the pearls they find. Experience has shown that few pearls, and these of little value, come from Mussels which are not older than five years. During the fifth and sixth year the value doubles, and in the seventh year it becomes fourfold. The pearls are not fully matured if they are not taken out too soon; and on the other hand, the animal dies, if the pearls remain too long in the shells. For these reasons pearl fishing is prohibited at certain seasons.

Up to the year 1863 there was no system in these fisheries. In 1863 there were caught on twenty-two fishing days 11,695,000 pearl-oysters, yielding pearls to the value of 918,324 crowns

(246,110·83 dols.). The next fisheries were in 1874, when 1,700,000 pearl-oysters yielded 182,160 crowns' (48,818·88 dols.) worth of pearls. In 1877 there were caught on thirty fishing days 6,850,000 pearl-oysters, yielding pearls to the value of 341,136 crowns (91,424·45 dols.). The yield in 1879 was unusually good, as twelve fishing days yielded 7,650,000 pearl-oysters. In 1880 the fisheries lasted from March 19th till April 2nd, and during these eleven days 11,000,000 pearl-oysters were caught. In 1881 as many as 60,000,000 were caught, yielding pearls to the value of 1,080,000 (289,440 dols.). These fisheries are now carried on according to a well-regulated system. The divers receive their wages as soon as they reach the coast.

When the pearls have been gathered, they are classified in the following manner:—

(1) "Anie," pearl-eyes; that is, pearls of perfectly round shape and pure lustre.
(2) "Anathorie," that is, pearls which have a slight defect in either of these respects.
(3) "Masengoe," pearls which have defects in both these respects.
(4) "Kalippo," pearls which are flat, and have other great defects.
(5) "Korowel," faulty pearls, especially double pearls.
(6) "Peesal," misshaped pearls.
(7) "Codwee," misshaped pearls of tolerably fine form.
(8) "Mandongoe," split pearls.
(9) "Kural," very small misshaped pearls.
(10) "Thool," seed-pearls.

In sorting the pearls they are first passed through a row of baskets, ten or twelve in number. The eighth basket in the row has twenty holes, and the pearls which do not pass through these are said to have the "twentieth measure." The following baskets have 30, 50, 80, 100, 200, 400, 600, 1000 holes, &c., and each basket has its special name. After the pearls have been sorted in this manner, they are weighed, and their value is noted.

China has pearl fisheries near Pakhoi. The beds are divided into four districts which lie between the south coast of the peninsula of Pakhoi, the island of Weichow, and the peninsula of Leichow. In 1875 these fisheries yielded pearls to the value of about 162,000 crowns (43,416 dols.). Cochin China carries on an extensive trade in mother-of-pearl, most of which comes to the Bay of Tirwar. On the north coast of Japan considerable quantities of *Haliotis gigantea* are caught, which is highly prized by both the Japanese and Chinese.

The Philippine Islands produce large quantities of mother-of-pearl. In 1877, 155 tons were exported; in 1878, 152 tons, valued at 307,314 crowns (82,360·15 dols.); in 1879 the yield amounted to 288,810 crowns (77,401·08 dols.). The entire region from the island of Tawi-Tawi and Sulu to Baselan is one cotinuous bed of pearl-oysters. Here the Malays and Chinese fish in common. The Sulu fisheries, near Tawi-Tawi, are, according to the statement of an Englishman (Mr. Moore), the largest and most productive of all the pearl fisheries in the East Asiatic seas. The pearls which are caught here have always been famous, and the mother-of-pearl is distinguished by its yellow lustre, which makes it suitable for many purposes. Labuan is the principal market for the produce of Sulu. In 1868 the value of these pearl fisheries was 207,972 crowns (55,736·50 dols.); in 1870 it fell to 102,348 crowns (27,429·26 dols.); and up to 1878 it fell still more. Macassar is the principal market for the natives from Bayos. In the Kau Bay there are found pearl beds belonging to the Sultan of Ternate. Pearls and mother-of-pearl are found near the island of Aru, and are brought to market at Debbo. The principal place where these fisheries are carried on, however, is Blakong Tanah, opposite the island of New Guinea; and these are really the most important fisheries in the entire archipelago. The yield in 1860 amounted to 133,000 crowns (35,644 dols.). The island of Timor has pearl beds, but the yield is small.

The most important pearl fisheries in Queensland are in the hands of Sydney capitalists. The fisheries are carried on by Malays, who dive to a depth of six fathoms. The pearl-oyster from Torres Strait generally weighs from three to six pounds, and sometimes as much as ten pounds.

The pearl fisheries on the north-west coast of Australia employ a large number of Malays and natives as divers. The fisheries last from the end of September till the end of March. It has not yet been possible to ascertain the extent of the beds; it is supposed, however, that they extend as far as the Gulf of Carpentaria. The fisheries are carried on for the shells, but frequently yield pearls of considerable valne. These shells are the best which are known. They weigh from 1½ to 6 pounds a pair. The export duty is 72 crowns (19·30 dols.) per ton. The oldest fisheries in West Australia are carried on in Sharks Bay. The shells which are caught here are those of the *Avicula margaritifera.* They are very thin, but their inside surface is transparent, and has a beautiful pearl-like lustre. At present they fetch a good price at Havre. Formerly they were but little esteemed on account of their thinness, and for this reason they were taken principally on acount of their pearls. These have a brilliant lustre, although they are not larger than a pea. The Oysters are caught with a wire drag-net, which is drawn across the beds, and which piles them in a heap; thereby the mollusk is killed, and the shells are easy to open. The West Australian pearl fisheries increase from year to year. In 1874 mother-of-pearl was exported to the value of 1,060,707 crowns (284,269·48 dols.), and pearls worth 108,000 crowns (28,944 dols.). In 1876 there were exported to London 140 tons, and to Singapore 67 tons, the price varying from 4500 to 4840 crowns (1206 to 1297·12 dols.) per ton. Recently the English papers have reported the discovery of pearls and mother-of-pearl near New Zealand.

Diving for pearls is one of the principal employments for the natives of the Pacific Ocean. Here, likewise, mother-of-pearl is the principal object of the fisheries. The Oysters live in large colonies, close together, and are firmly attached to each other; they are attached to the bottom by a ligament or band, starting from their body and running through the shell. In the live animal this band is of a dark green, and sometimes gold-bronze colour, and the fishermen can tell from its colour whether the shells contain pearls or not. The shells reach their full size when they are seven years old. The average weight of the empty shell at that time is about one pound, and the length varies from ten to eighteen inches. When the animal has reached maturity, it tears itself loose from the stones, opens its shell, and dies. The shells are then covered with corals and parasites. They become worthless and the pearls are lost. These mollusks also have a number of enemies, the most dangerous of which is a kind of *Scolopendra,* which opens the shells and eats the mollusks. All grown Mussels are, moreover, infested by crustacean-like parasites, which penetrate into the shells and there lay their eggs.

After the Oysters have been caught and brought ashore by the divers, they are sorted. The shells are opened with a steel knife.

A skilled hand can open a ton per day, and not miss a single pearl. The mother-of-pearl is laid in a shady place, that the colours may not fade. When there is a famine, the mollusks are eaten by the natives. The pearls are generally found in the place where the band before mentioned starts. In shells where many pearls are found, they are generally small and misshaped. Occasionally pearls are found loose in the shells. These are always of a very fine quality, perfectly round, and often very large. But there is hardly one in a thousand Oysters which contains such pearls. The natives often lose them, owing to the careless way in which they open the shells.

Fine and calm weather is most favourable for pearl-fishing. The divers wear no special suit, but simply rub their body with oil, that the sun may not blister their skin. They remain under water one to two minutes, and bring up Oysters from a depth of twenty fathoms. They rarely go to such a depth, but the finest Oysters are found there. Thus in many fishing-grounds, which were supposed to be exhausted, a great many pearl Oysters are found in deep water.

In the Southern Pacific, pearl fisheries are principally carried on near the Navigator's Islands in the Paumotu Archipelago. Many of these fishing grounds are partly and some are entirely neglected. Thus the island of Manihiki twenty years ago yielded 100 tons of shells in eighteen months; but since that time no pearl fisheries have been carried on there. The Hogolen Lagoon is also known as a vast unexplored pearl-oyster bed. So far the Paumotu Archipelago is said to have produced 25,000 tons of mother-of-pearl, valued at 18,000,000 crowns (4,824,000 dols.). Nearly the entire quantity goes to Tahiti, to be exported thence. In 1873, 2000 tons of shells were exported; the pearls having a value of about 140,000 crowns (37,520 dols.). In 1878 Tahiti exported 591 tons of shells, valued at 638,280 crowns (171,059·04 dols.), and pearls valued at 108,000 crowns (28,944 dols.). In 1679 there were exported 470 tons of shells, valued at 507,600 crowns (136,036·80 dols.), and pearls valued at 72,000 crowns (19,296 dols.). In 1875 an export duty of 30 crowns (8·04 dols.) per ton was levied; this duty, however, was abolished in 1878, and since that time the exportation has again increased.

On the islands of the Pacific the pearls are classified as follows (see Simmonds's 'Commercial Products of the Sea,' p. 425):—

(1) Pearls of a regular form and without faults; in value those weighing a decigram, are worth only 2·7 crowns (0·72 dol.); those weighing from 1½ to 2½ grams, from 1800 to 2600 crowns (482·40 to 696·80 dols.).

(2) Round white pearls of great lustre; 30 grams, containing 800 pearls, would be worth only 72 crowns (19·30 dols.); while the same weight in 50 pearls would be worth 1080 crowns (289·44 dols.).

(3) Irregularly formed pearls, not without faults; 30 grams of this kind would be worth 55 to 75 crowns (14·74 to 20·10 dols.), according to their condition.

(4) Pearl-bulbs, which are found attached to the shells; 30 grams are worth from 25 to 36 crowns (6·70 to 9·65 dols.), according to their regularity of form and brilliancy.

(5) Seed-pearls, which are worth from 36 to 55 crowns (9·65 to 14·74 dols.) per pound.

Mother-of-pearl fetches from 25 to 50 öre (6½ to 13½ cents.) per pound. The principal markets for pearls from the Pacific are Hamburg, Amsterdam, London, and St. Petersburg.

Besides the pearl-oyster, there is often found in the lagoons of the Pacific Ocean a kind of *Venus* shell, which often contains pearls of great value. Tne fishermen do not look for these pearls at all, but it is presumed that it would pay to examine these shells more systematically.

In the Pacific there is found another pearl-producing mollusk, whose shells greatly resemble those of the common Oyster. They are always found attached to rocks, invariably one by itself; and they are quite rare. Their pearls are always perfectly round, with a fine lustre and a gold colour, of about the size of a pea.

The Central American pearl fisheries are carried on on both sides of the Isthmus of Panama. In the Bay of Panama are located the Pearl Islands, of which San José is the most important, yielding every year from 800 to 1000 tons of mother-of-pearl. In 1869 the English imported pearls valued at about 800,000 crowns (214,400 dols.) from New Granada and St. Thomas; while the average annual yield of the Panama fisheries is about 500,000 crowns (134,000 dols.). In the lower part of the Bay of Mulege, in the Gulf of California, and near Los Coyntes, pearls of great value have been found. It is generally supposed that a row of pearl-beds extends from the Gulf of Darien to California. In the last-mentioned bays, and on the coasts of Costa Rica and Central

Mexico, pearl fishing has long been a remunerative employment. The principal fisheries on the Mexican coasts are carried on between Mulege and Cape San Lucas. Near the Islas tres Marias and in the neighbourhood of Acapulco the fisheries are not nearly so important. The mollusks found are *Meleagrina margaritifera* and *Haliotis rufescens.*

The fisheries are carried on from July till October; during the rest of the year storms and cold weather prevent fishing. Diving suits are generally used. The mother-of-pearl from the Gulf of California is white, with bluish-black or yellow bands. The fisheries were carried on to such an excess that the size of the shells decreased from year to year; fishing is therefore now permitted only every fourth year. The Californian shells are sent almost exclusively to Hamburg, whence they go to England, Austria, and France. The largest quantity goes to Paris, but a great deal also to Frankfort-on-the-Main. The entire Californian fisheries are said to produce from 600,000 to 700,000 pounds of mother-of-pearl per annum. In 1879 Costa Rica exported 3540 pounds. In the same year Panama sent pearls to the value of 126,000 crowns (33,768 dols.) to the New York market. Guayaquil, in 1871, exported thirteen to fourteen tons of mother-of-pearl. In the Bahamas the snail fisheries form an important industry. The pearls found in them are rose-coloured, yellow, or black; the first mentioned alone possess any value. The market for these pearls is Nassau, in the Bahamas; and it frequently happens that a pearl fetches as much as 400 crowns (107·20 dols.). The average annual yield is 180,000 crowns (48,240 dols.). In the State of Ohio pearl fisheries are carried on in Little Miami River. The season lasts from June till October. Men and boys wade in the river and bring up the pearl-oysters with their feet. The shells are opened with a knife; and seldom are more than two pearls found in 300 Oysters. Pearl fisheries are also carried on in the rivers of Norway, Bavaria, and Bohemia.

[An account of the Pearl Fisheries of Australia, by Mr. G. W. Griffin, U.S. Consul, Sydney, N.S.W., will be found in 'The Zoologist,' 1887, pp. 289—292.—Ed.]

ORNITHOLOGICAL NOTES FROM NORTH LINCOLNSHIRE.

By John Cordeaux.

These notes have reference to occurrences in the district in 1887. I regret they are not continuous, as I have been much from home and for considerable intervals.

January 5th. Hard frost, and about four inches of snow on the level. Noticed five or six Stonechats on the sides of our main drain, and along the Humber embankment, perched on dead plants of ragwort and teasel or the tall withered stalks of the cow-parsnip, *Heracleum sphondylium*—a favourite perching-place of these little birds. All were in the reddish-brown livery of autumn, and I believe adults. Saw also a single Snow Bunting: they have been remarkably scarce in the autumn and winter in our marshes, but are reported as very plentiful in stubbles in the Trent district. A small flock of ten Wild Ducks, *Anas boschas*, also about one hundred and fifty Wigeon swimming in the river off our main sluice. I was watching them through a glass when seven White-fronted Geese passed inland, almost within range.

Jan. 7th. Severe frost and snow. Noticed three pair of Meadow Pipits in the sheep-fold on turnips; directly a frozen root is dragged they rush into the cavity to search for any small insects or larvæ concealed between the bulb and soil, and totally regardless of the near proximity of men, or of the shower of turnips cast in from the outsides to the central heap. Pied Wagtails and Stonechats in severe weather also haunt sheep-folds, the only place where they have any chance in prolonged snow-storms of obtaining insect-food.

Jan. 12th. I saw to-day at the birdstuffer's nine Kittiwakes in the flesh, brought from sea in one of the smacks. Some were young with black beaks, the back of the head and nape with smoky-grey patches; old birds with yellow-green beaks. Counted forty-two Scaup, *Fuligula marila*, off the sluice; some are old males and a few old females, but the latter not easily, through the glass, distinguishable from the remainder,—young of both sexes in about equal proportions,—except by the greyer back and more conspicuous frontal patch of the older bird. On the muds are some Grey Plover, besides Ringed Plover, Knot, and Dunlin, and near the tide-edge—now covering half the flats—a cluster of

Brown-headed Gulls, *Larus ridibundus*, one of which had completely got his dark-brown head dress. Another showed a most peculiar state of change; the head, the ground-colour of which was white, was crossed with two narrow dark bands, one in front of the eye extending across the forehead to beneath the lores, the other across the occiput to below the auriculars. Several Pochards, *Fuligula ferina*, were shot on the Humber in January, and amongst them some old males, which I always consider quite an exceptional occurrence on our waters; the majority of those obtained here in the winter are females or young of both sexes.

Jan. 26th. Two pairs of Mistletoe Thrushes came to the lawn to-day, their first appearance since they left in the autumn.

February 4th. Examined three Bar-tailed Godwits shot on the coast near Cleethopes. Comparatively few remain after the autumn migration in August and September.

Feb. 8th. There are thirty-eight Scaup off the sluice, males and females in exactly equal proportion—nineteen and nineteen—and swimming in pairs; the former have glossy dark heads and necks shot with green, their wives with the same parts a rich-looking velvet-brown with a frontal band of white, and these contrasting colours as they swim side by side have a very pretty effect.

Feb. 24th. Out of some Knot brought up from the coast to-day I found one which had the breast and abdomen marked with large detached spots of a faded red, evidently the remains of the plumage of the previous summer.

Feb. 25th. Lapwings are paired; first Pied Wagtails seen; many Meadow Pipits in Humber Marshes.

April 5th. Wheatears very numerous, but all appear to be males; several I noticed perched on old stalks of brussels-sprouts and cauliflowers cultivated in the open field.

April 7th. Observed both Redpoles and Coal Tits searching for food amidst the green tufts and rosy plumes of the opening larch. A pair of the former nested with us this summer, high up in the corner of an old hedgerow abutting on one of the large marsh drains.

May 10th. The Dunlins on the foreshore have now got their summer livery and the black pectoral patch. There are about a score of Grey Plovers left, more or less in summer plumage, and a few Whimbrels and Curlews. Carrion Crow in marsh sitting on nest in the centre of a rough thorn; the nest is just too high to look into, and the bush much too thick and scratchy to get at the eggs. There are now, within a two-mile radius of the house, four Nightingales to be heard. The Nightingale haunts chiefly those places in woods and plantations where the blackthorn grows the closest and strongest.

May 12th. Godwit, Ringed Plover, Dunlin, Whimbrel, and Curlew on the foreshore.

August 6th. Many Curlews in the marshes on pasture land.

August 7th. Wind strong S.W. Early this morning I noticed an unusual number of Willow Wrens in the garden, chiefly on the rows of peas, where it was pleasing to watch them creeping up and down, now showing their olive-green upper plumage and then the delicate lemon-tinted throat and breast. I have no doubt they formed part of some migratory band, as I looked in vain for them a few hours later.

August 18th. Warm and very close, with thunder impending. At 10 p.m. there was a very large flight of Wild Geese over the house, apparently circling round with much noisy clamour.

August 25th. The last fortnight in August and early in September were remarkable for the very unusual number of Curlew Sandpipers. Near Spurn, on this day and the following, I saw several hundreds, also about half a dozen Little Stints, the two species having migrated at the same time as on previous occasions. A few examples of the former were all young birds, having the under parts suffused with buff; so also have young Knots and Godwits, birds the adults of which in summer have the lower parts chestnut-red. Sept. 2nd was an important migration day, commencing with a gale from S S.E., but at mid-day from S.W. Knot in summer plumage arrived in flocks, Little Stints in large flocks,—one hundred together,—many Black Terns also with the commoner species, some of the former being mature birds. On this night at 9.30, in my own garden here, I distinctly heard the note of the Little Stint passing overhead amongst those of other waders. Both Curlew Sandpiper and Little Stint were fairly plentiful at Spurn up to the middle of September.

August 26th. I saw both the Redstart and Pied Flycatcher near Kilnsea to-day, also, on the Humber side of the Spurn, Knot, Curlew, Whimbrel, Common Godwit, Curlew Sandpiper, Sanderling, Ringed Plover, Dunlin, Turnstone, eight Golden Plover with black breasts, and two Grey Plover also in summer plumage, also Green Sandpiper and the Common Sandpiper on the ponds near Kilnsea Beacon; on the Warren the Greater Whitethroat and many Wheatears.

Sept. 6th. Redstart on passage through this parish; and on the 7th great numbers of Wheatears.

Sept. 23rd. First Woodcock seen. Under date of Nov. 10th, a curious note comes to me from the Swin Middle L.V.: when the lantern was lowered at sunrise a fine Woodcock was found dead on the top. Now if the bird had struck the lantern in flight it would either have fallen on deck or into the sea; the probability therefore is that it alighted on the lantern top, and simply died from exhaustion.

October 2nd. Large numbers of Redbreasts appeared about this date; they are particularly plentiful in the hedgerows near the coast. A young friend who was fishing, on October 1st, ate in the evening, at Croxby Pond,—a lone sheet of water, surrounded by plantations, in the heart of the North Wolds,—first heard and then saw a pair of Ravens. He is well acquainted with the birds, having watched them in their haunts in Norway, and I have not the least doubt of the correctness of his observation.

Oct. 12th. Driving this morning along the straight road from Tetney to the coast, in a field to the left, next to the coast-guard station, my attention was attracted to a large handsome high-standing Pipit, which I am only able to identify with *Anthus richardi*, an Heligoland example of which I obtained this year. There were several Larks on the ground near it, several also on the wing, small numbers coming in at intervals during the morning and passing inland; compared with these, it appeared larger and stood considerably higher; the breast was very distinctly marked with numerous elongated spots. During the short time I was able to observe it the bird seemed shy and wary, stretching out its neck, and the moment I attempted to get down it was off, keeping on the wing till lost sight of. Richard's Pipit is also supposed to have been seen at Spurn this autumn. I saw one Greenshank to-day on the Tetney "fitties," and heard another calling; Mr. Caton Haigh told me he had seen more of them in September than in any previous year: on a flat coast it is an extremely difficult bird to approach, rising a long way out of shot, and I always consider it quite an event to shoot a Greenshank.

December 1st. I have seen about six examples this autumn of the Long-tailed Duck, *Harelda glacialis*, shot in this neighbourhood or at sea; one of these was a female, very distinctly marked about the head and neck, the rest young of the year. They are seen far out at sea, also in shallow waters near the coast, and near the mouths of sluices and havens where the tide mixes with the fresh land-water. In the evening, at flight time, I have known them fly inland to pitch in "flashes" on open fresh waters near the coast. I have seldom known the adult male as far south as the Humber mouth.

Dec. 8th. I saw weighed to-day a Curlew which was slightly over forty ounces.

NOTES AND QUERIES.

The word "feral."—I quite agree with Mr. Wharton that knowledge ought to contribute to the growth of language, but the word "feral" looks like an addition to language from the very opposite to knowledge. The state of the case is this; that "feral" (or *feralis*) means simply "funereal," or "relating to the Feralia Festival" (I do not deny that it had certain other secondary meanings, as "*ferale bellum*," a war productive of funerals, but "wild," or anything like it, was not one of them); that certain writers have used it carelessly, supposing that it was connected with "ferus," which Mr. Wharton admits that it is not, being, as he says, from a totally different root; and that other writers have adopted it without sufficient examination. It is hardly worth while saying anything from the "useful variant" point of view, for it would be quite possible for an ingenious person to argue that chalk and water would be a useful variant for milk. And I see every reason, therefore, including simple accuracy, why this absurd etymological blunder should be gainsaid. I cannot admit Mr. Chapman's plea of euphony for confusing two distinct and unrelated words. It would be adding insult to injury were we to persist in calling a man "Tom" whose real name was "John," and, on his remonstrating, attempt to console him by saying that it was for the sake of euphony, and that his real name was practically obsolete. It was not "much indignation," as Mr. Wharton suggests, which moved me to protest against this base-born term, but a consideration of the far greater precision which botanists have brought to bear on the same question—partly, if I remember right, at the instance of the late H. C. Watson. They have the following terms;—"*Escape*," which would satisfy the conditions of our Egyptian Geese and Purple Gallinules, and implies human agency; "*Alien*," comprising what we call "accidental visitors," not imported by man. These may become, by establishing themselves, "*Colonists*," like the Rabbit in Australasia, or the Sparrow in America; the Capercaillie in Scotland is now also, strictly speaking, a colonist. [In this we cannot agree.—Ed.]. Botanists also use the word "denizen," the exact shade of meaning of which I cannot at present recollect. It seems to me that some such arrangement might be introduced into Zoology, without violating the unities by adopting such words as "feral."—Henry H. Slater (Irchester Vicarage, Wellingboro').

MAMMALIA.

Wolves in France.—Five years ago the increase of Wolves in France had become so serious that the Government found it necessary to increase the rewards for killing them. In 1882, 423 Wolves were killed; in 1883, 1316; in 1884, 1035; in 1885, 900; and in 1886, 760. The rewards are now 200 francs for the killing of a Wolf which has attacked human beings; 150 francs for one with young; 100 francs for a male Wolf, and 40 francs for a cub.

The derivation of the name "Badger."—As supplemental to the Editor's interesting remarks on the origin of the word "Badger" (pp. 3, 4), it may be well to refer to the conclusion arrived at by Dr. Murray, in the elaborate 'New English Dictionary upon Historical Principles,' which is now issuing from the Clarendon Press, Oxford. He there cites the use of the forms "Bageard" (in 1534) and "Badgerd" (in 1598). He cannot find "Badger" in print earlier than in 1523, and he allows that its etymology is doubtful. But Dr. Murray thinks it probable that E. Müller's suggestion is the right one, and that the name clearly comes from the substantive *badge*, with the termination *-ard;* in reference to the white mark borne like a badge on the animal's forehead. He gives a number of reasons why this derivation should be accepted, the chief of them being that another name of the badger, "Bauson," obviously refers to its piebald face.—Henry T. Wharton (39, St. George's Road, Kilburn).

The Badger in Buckinghamshire.—In the article on this animal which appeared in 'The Zoologist' for January, no mention is made of its occurrence in the county of Buckingham. There are several of its strongholds in this neighbourhood. On one farm about four miles from this town seven Badgers were captured in one night. On another farm Badgers have taken possession of a piece of ground which is of a loose stony nature, and are extremely difficult to get at with dogs, for upon an alarm the animal within its burrow immediately begins to block up the passage with loose stones and soil. By the time the dog has removed this obstacle, if it has the perseverance to do so, the Badger has made its way into another burrow and escaped.—F. HAYWARD PARROTT (Walton House, Aylesbury).

Antiquity of the name "Lobster" for the Stoat.—In Gairdner's edition of the 'Paston Letters' (vol. iii. p. 365), there is a letter from Sir John Paston, written about 1490, asking for "vj corspyll blake conyes or rennying rabbettys or some blake and some whyght . . . . to store with a newe grownd . . . . at Oxenhed" (Norfolk), and referring to the practice of warreners in hanging up "mysdoers and forfaytours, as wesellis, lobsters, polkattys, bosartys and mayne currys." The above may be of interest as giving an earlier date for the term "Lobster" than that quoted at p. 20 of the last number of 'The Zoologist.'—J. H. GURNEY (Northrepps Hall, Norwich).

Squirrel eating Small Birds.—A friend of mine near Oxford captured a wild Squirrel, and having an aviary containing Canaries, turned his newly-found pet in with them. All went well for some days, and he fed the Squirrel with such food as it delights in. However, on coming down one morning, imagine his horror at finding two of his Canaries gone, and only feathers left strewed about. Keepers have often told me of Squirrels sucking Pheasants' and Partridges' eggs, and of their catching them in traps set for Jays, baited with eggs of small birds, but I have discredited their stories, though I now admit the probability of such acts on their part. Is it an uncommon thing? Perhaps some of your readers may have something to say on this, to me, new food for the Squirrel.—G. T. PHILLIPS (Wokingham, Berkshire). [See a note by Capt. Saville Reid, Zool. 1885, pp. 229.—ED.]

Bank Vole in Leicestershire.—In my "Notes on the Vertebrate Animals of Leicestershire" (Zool. 1885, p. 219), I wrote:—"I have not yet met with this species in Leicestershire, but it doubtless occurs, as Mr. Ingram, writing on February 7th, 1885, and enumerating the mice and voles, says, 'and another, also short-tailed, but of a light fox-coloured skin." Since then, this little animal has, as I imagined it would, turned up quite commonly at Belvoir, from whence, through the kindness of Mr. John Ryder, I received several specimens—*i.e.*, out of nine Field Voles sent to me on 2nd and 3rd July, 1885, four were of the rarer species, which, with others, were exhibited on the 6th at a meeting of the Zoological Section "E" of the Leicester Literary and Philosophical Society, and upon which I made the following remarks, afterwards published at p. 27 of the 'Transactions of the Leicester Literary and Philosophical Society,' October, 1886:—"I should not imagine this species to be very rare, but to be merely confounded with *A. agrestis.* Colour I found to be of little aid in discriminating one from the other, especially when not fully adult, and I do not think the hard-and-fast colour test, as laid down by Bell, to be of much assistance." The external points which struck me as of importance are:—(1) Tail of greater length than in the common Field Vole, *Arvicola agrestis*, being about one half the length of the body; (2) Tail more hairy above and whiter below than in *A. agrestis;* (3) The paws are whiter, or not so dusky, as those of *A. agrestis;* the bare parts around the mouth are also a little whiter, or purer in tone, and of greater extent; (4) A slightly purer, or more silvery grey tint (certainly not *white*, as stated by Bell) pervades the abdomen, than in *A. agrestis;* and, lastly, the fur is everywhere longer, and a trifle finer, than in *A. agrestis*, but the chestnut colour on the back is not so marked a difference between the two species, as stated. Internally, all is perfectly clear, and if the greater length and less breadth of the skull is not quite so easily seen, the presence of double roots to the molars—leaving out the pattern of the cusps—distinguishes it at once from *A. agrestis*, in which, as with the Water Vole, the molars have single roots.—MONTAGU BROWNE (Leicester).

BIRDS.

Long-tailed Duck and Common Skua in Dorset.—During the month of November several Long-tailed Ducks frequented Poole Harbour, five of which were shot. One was a fine adult male in full plumage, which is a rare occurrence so far south; the other four were birds of the year, and therefore in more sombre plumage. A Common Skua was shot by a gunner in Poole Harbour on November 19th, and is now in the possession of Mr. Robert Burns, of Wimborne. This bird when first observed was in company with a lot of Wigeon, one of which it had struck down, when the gunner, firing into the flock, killed the Skua as well as several Wigeon.—J. C. MANSEL PLEYDELL (Whatcombe, Blandford).

The Long-tailed Duck.—In my note on a Long-tailed Duck with a curiously spotted breast (p. 31) I omitted to state that the bird was a young one, with dark scapulars, and the trachea of the female. This prevents me from accepting your suggestion that the bird was a male of the second year. In point of fact, the variation I allude to seems to occur at intervals among young Long-tailed Ducks, for Temminck seems to hint at it, though neither Yarrell nor Seebohm do so. Judging from my experience of Long-tailed Ducks, the variation can hardly occur in any high percentage, but I should be glad to hear from others. Amongst forty-two birds killed during the last few months, and since examined by me, the majority were females, but the specimen under discussion was the only bird spotted on the breast. I may add that the spots extend over quite half of the inferior surface of the body. No doubt the variation is due to immaturity; but as it stands unnoticed in the text-books above mentioned, your readers will forgive this second reference to the subject.—H. A. MACPHERSON (Carlisle).

Hobby taking Insects on the Wing.—Recently, when residing at Kursali, in the Himalayas, I used to notice in the evenings a flock of small hawks hunting round the top of a hill; they appeared to be taking something on the wing. To make quite sure, I took my gun and shot one, and on picking it up found it was a Hobby. On opening it, its stomach was crammed with legs and wing-cases of beetles. These little falcons appear particularly active in feeding at sunset when various insects are on the wing; their movements are as graceful as those of the Swallow. I see Dr. Jerdon, in his 'Birds of India,' mentions this fact. Prof. Newton also, in 'Yarrell's British Birds' (4th ed.), remarks that their food appears to consist less of birds than of coleopterous insects, and that the stomachs of two specimens examined by Mr. Henry Doubleday were filled with the common dung-chaffer.—W. WILFRID CORDEAUX (Queen's Bays, Umballah, Nov. 10, 1887).

The Whimbrel in Somersetshire.—Referring to my note respecting the Whimbrel in this county (Zool. 1887, p 466), I find my informant was in error. I saw these birds on the moors about the 15th May, and my companion, who lives near, said they were there "during the summer." A few days ago I had the opportunity of talking to a young sporting moor farmer, and he says that they arrive in greater or less numbers about the end of April or the first or second week in May, and remain about three weeks, which coincides with your foot-note. In his village they are called the "cowslip bird," as their numbers are supposed to be greater or less, according to the good or bad cowslip year.—H. ST. B. GOLDSMITH (Bridgewater).

Jay in Co. Wexford.—With reference to Mr. J. E. Palmer's enquiry as to whether the Jay is resident anywhere near Kildare, it may perhaps interest him to know that it is abundant near New Ross, Co. Wexford. About thirty years ago Jays and Squirrels were introduced at Stonestown (near New Ross, and since that time they have hardly spread through the county at all, though they are common and resident at Stonestown. Squirrels, on the contrary, are now quite common at a distance of seven or eight miles from New Ross.—G. E. H. BARRETT-HAMILTON (Kilmanock, New Ross, Co. Wexford).

Autumn Migration of Birds in Co. Waterford. — Being further removed than Mr. Ellison from the sources of migration, I could not observe the arrival of such large and unbroken flocks as he mentions (p. 18); but in corroboration of his statement as to the abundance of winter migrants this season, I may mention that whereas Starlings (which with us are winter visitants) seldom settle here before December, or later, I have this season observed them feeding in flocks all over the country since the 23rd

October, or earlier, the abundance of these birds being unusually great. They generally pass inland in October from Dungarvan Bay, flying swiftly without alighting along the line of this valley, which stretches towards Co. Kerry. They often settle in the low-lands near the coast for weeks before they do so in this inland locality. In October I observed unusually large flocks of Sky Larks in the stubbles, which swarmed with them, evidently an immigration. Redwings appeared in October, but until December were not numerous, probably owing to the dryness of the soil having caused a scarcity of their insect-food. On the 21st and 22nd of December we had a hard frost, with a north wind blowing over snow-covered mountains. During those two days Redwings continued to pass constantly westwards, in flocks of all sizes and singly, with a few Blackbirds. Some small flocks of Fieldfares, keeping apart from the rest, passed in the same direction. This species is usually uncommon here, though they become numerous in very severe frosts. On the 23rd December there was a thaw, and the wave of migration appeared to cease. — R. J. USSHER (Cappagh, Waterford).

Varieties of Common Wild Duck.— Two pretty varieties of the Common Wild Duck were taken in the decoy at Park Hall, during the first week of the New Year. They were both of a pale slate-colour on the back, wings light grey, speculum very pale grey, and shafts of wing-feathers white; breast pale sandy; the feathers on back were edged with sandy brown, here and there being one of normal colour; one had the wing-coverts of a sandy buff.—J. WHITAKER (Rainworth Lodge, Notts).

Swifts laying in Martins' Nests.—This is probably not a very rare occurrence. Several pairs of Martins build almost every year under the eaves of my house. They are almost uniformly dispossessed by the House Sparrows. The Sparrow waits till the nest is nearly finished, then, after a great deal of chattering on the nearest window-moulding, he suddenly pops in when the Martins are away, and sits chirping maliciously on the edge. The Martins never make any fight, but submit meekly to eviction and go elsewhere. At intervals I get the nests cleared of the straw and feathers brought in by the Sparrows, and it has happened more than one year that after the intruders have been thus ejected a nest has been taken possession of by a pair of Swifts. Whether by address or force, the Swifts seem much better able to hold their own against the Sparrows, and sometimos succeed in rearing their young. I have seen a Sparrow chased vigorously away from the nest by a Swift; but have never seen a Martin make any resistance. One year we watched the Swifts all through the season in the nest in which they had succeeded the robber Sparrows. The nest was close to a window, and we could see the wings of the Swift projecting as she sat on her eggs.— F. W. PRICE (Blackrock, Co. Dublin).

MOLLUSCA.

A new List of British Mollusks.—We are pleased to bring to the notice of conchologists a new list of Mollusks which has lately reached us. It is printed in clear type on one side of the page only, post octavo, and is entitled "A Complete Catalogue of British Mollusca, compiled from Gwyn Jeffreys' 'British Conchology,' with alterations and additions to date, by Charles Jefferys." Recent though it be, it is nevertheless not quite up to date, for many of the species added in the second edition of Sowerby's 'Illustrated Index' do not here find a place; genera in many instances have not been altered or revised; whilst it is a matter for regret that Fischer's more recent classification has not been considered; but this of course would have necessitated the omission of Gwyn Jeffreys' name—a potent talisman with many. Handy as this Catalogue undoubtedly is, a greater desideratum would be a list brought thoroughly up to date, with sufficient space left between the names in which to write the locality, when a complete label could be cut out and used. To save space, we would readily forego the innumerable and worthless varietal names with which the present Catalogue is interspersed, to the delight, it may be, of the tyro, but to the amusement not unmingled with vexation, of the experienced conchologist. The new list may be obtained of Mr. H. W. Marsden, of Gloucester.

PROTRACHEATA.

Peripatus in New South Wales.—It may interest your readers to know that during a visit which I recently paid to Cassilis, a small town situated on one of the tributaries of the Hunter River, and some 120 miles from the coast, I had the good fortune to find *Peripatus* (presumably *P. Leuckarti*, Sänger) under a stone at the foot of a grey gum tree. As yet, I believe, there is no record of the occurrence of *Peripatus* in this colony, nor has it previously been found so far from the sea-coast. My specimen agrees in every particular with the one from Gippsland, Victoria, which Mr. Fletcher exhibited at the July meeting of the Linnean Society of New South Wales.—A. SIDNEY OLLIFF (Australian Museum, Sydney, Nov. 5, 1887).

[Mr. Fletcher's specimen is stated (Proc. Linn. Soc. N. S. W.) to have been found under a rotten log at Warragul, Gippsland, Victoria. Others from Cardwell and Brisbane were exhibited by Mr. H. Tryon at a meeting of the Royal Society of Queensland in April last, and Prof. Jeffery Bell has recorded (Ann. Mag. N. H. 4887, p. 252) the receipt of specimens from the Queensland Scrubs, Wide Bay. The above note, therefore, from Mr. Olliff indicating a new and intermediate locality, shows the wide range of *Peripatus* on at least the eastern side of the Australian continent.—ED.]

SCIENTIFIC SOCIETIES.

Zoological Society of London.

December 20, 1887.—Professor W. H. Flower, C.B., LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of November, 1887.

Mr. Sclater read a letter from Dr. H. Burmeister, containing a description of a supposed new Humming-bird from Tucuman. Mr. Sclater proposed to call this species, of which the type was in the National Museum of Buenos Ayres, *Chætocercus burmeisteri.*

The Secretary exhibited, on behalf of Major Yerbury, a pair of horns of the Oorial, *Ovis cycloceros*, which formerly belonged to the Royal Artillery Mess at Fort Attock, and were stated to have been originally obtained in the Chitta Pahar Range, a few miles south of Attock. These horns were apparently of the form lately described by Mr. A. O. Hume as *Ovis blanfordi.*

An extract was read from a letter received from Mr. H. M. Phipson, of the Bombay Natural-History Society, offering some living Snakes for the Society's collection.

Mr. F. E. Beddard read a paper on Hooker's Sea-lion, *Otaria* (*Arctocephalus*) *hookeri*, based upon the specimens of this species recently received by the Society, one of which had lately died. The author called attention to the external features, visceral anatomy, and osteology of this Sea-lion, in comparison with the corresponding characters of other species of the group.

Mr. G. A. Boulenger read the description of a new genus of Lizards of the family *Teiidæ*, founded on a specimen presented to the British Museum by Mr. H. N. Ridley, who had obtained it in the Forest of Iguarasse, Pernambuco. The author proposed to name this lizard *Stenolepis ridleyi.*

A communication from the Rev. H. S. Gorham, entitled a "Revision of the Japanese species of *Endomychidæ*," was read. In this paper three new genera and thirteen new species were characterised and described. Additional observations were made upon the species previously known to inhabit Japan. The new species were based on specimens obtained by Mr. George Lewis during his last journey to the islands in 1880–81.

Mr. G. A. Boulenger gave an account of the fishes obtained by Surgeon-Major A. S. G. Jayakar at Muscat, East Coast of Arabia, which had been presented by him to the British Museum. The collection contained specimens of 172 species, many of which were unrepresented in the National Collection, and 15 of which were apparently new to Science.

Mr. H. Druce read a paper containing descriptions of some new species of Lepidoptera Heterocera from Tropical Africa.

January 18, 1888.—Dr. A. Günther, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1887, and called attention to a small Fox from Afghanistan, presented by Lieut.-Col. Sir O. B. C. St. John, which should probably be referred to the species shortly noticed by Blyth as *Vulpes griffithi.* It was, however, somewhat doubtful whether the species was really distinct from *Vulpes leucopus,* Blyth, the small Desert Fox of Western India.

Mr. Francis Day exhibited and made remarks on some hybrid fishes from Howietown, and on a British specimen of the Spined Loche.

Mr. Oldfield Thomas read a report on a collection of Mammals obtained by Emin Pasha in Central Africa, and presented by him to the Natural-History Museum. The collection contained 115 specimens belonging to thirty-nine species. The great mass of the collection had been obtained in a district called Monbuttu, just within the Congo Basin. A new Flying Squirrel, of small size, was named *Anomalurus pusillus,* and a new Tree-Hyrax, *Dendrohyrax emini,* after its discoverer.

Capt. G. E. Shelley read a paper on a collection of birds made by Emin Pasha in Equatorial Africa. The series had been formed partly in the Upper Nile district and partly in the Monbuttu country in the Congo Basin, and contained examples of four species new to Science, proposed to be called *Indicator emini, Spermospiza ruficapilla, Ploceus castanops, and Glareola emini.*

Dr. A. Günther read a report on a collection of Reptiles and Batrachians from Monbuttu, sent by Emin Pasha. The author enumerated seventeen specimens, of which nine were almost generally distributed over the African region; of the remäinder, seven were known from various parts of West Africa. One Tree-snake was described as new, and called, after its discoverer, *Ahatulla emini.*

Mr. Edgar A. Smith read an account of the Shells collected by Dr. Emin Pasha on the Albert Nyanza, Central Africa. Of the five species of which examples were obtained, three were referred to new species. It was stated that fifteen species of Shells were now known from Lake Albert, of which seven were peculiar to it.

Mr. Arthur G. Butler gave an account of the Lepidoptera received from Dr. Emin Pasha. The collection contained examples of 155 species, of which thirteen butterflies and two moths were new to Science.

A communication was read from Mr. Charles O. Waterhouse, containing an account of the Coleoptera from Eastern Equatorial Africa received from Emin Pasha. One of the species was new to Science, and six of them had previously been received at the British Museum from West Africa only.—P. L. Sclater, *Secretary.*

ENTOMOLOGICAL SOCIETY OF LONDON.

Fifty-fifth Anniversary Meeting, January 18, 1888.—Dr. D. SHARP, President, in the chair.

An abstract of the Treasurer's Accounts, showing a balance in the Society's favour, was read by Mr. H. T. Stainton, F.R.S., one of the Auditors; and Mr. H. Goss read the Report of the Council.

It was announced that the following gentlemen had been elected as Officers and Council for 1888:—*President*, Dr. David Sharp, M.B., F.Z.S.; *Treasurer*, Mr. Edward Saunders, F.L.S.; *Secretaries*, Mr. H. Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; *Librarian*, Mr. Ferdinand Grut, F.L.S.; and as other Members of Council, Mr. H. J. Elwes, F.L.S.; Sir John Lubbock, Bart., M.P., F.R.S.; Mr. Robert M'Lachlan, F.R.S.; Mr. P. Brooke Mason, M.R.C.S., F.L.S.; Mr. E. B. Poulton, M.A., F.L.S.; Mr. Osbert Salvin, M.A., F.R.S.; Mr. H. T. Stainton, F.R.S.; and the Rt. Hon. Lord Walsingham, M.A., F.R.S.

The President delivered an Address, for which a vote of thanks to him was moved by Mr. M'Lachlan, seconded by Mr. F. Pascoe, and carried.

A vote of thanks to the Treasurer, Secretaries, and Librarian, was moved by Mr Kirby, seconded by Mr. Waterhouse, and carried. Mr. Saunders, Mr. Goss, Canon Fowler, and Mr. Grut made some remarks in acknowledgment. Mr. Waterhouse proposed a vote of thanks to the Council, which was seconded by Mr. White, and carried. Mr. Stainton replied —H. Goss, *Hon. Secretary.*

NOTICES OF NEW BOOKS.

The Forest of Essex: its History, Laws, Administration, and Ancient Customs. By W. R. FISHER, of Lincoln's Inn. Barrister-at-Law. 4to. London: Butterworths. 1887.

THE *raison d'être* of this handsome quarto, briefly alluded to in the Preface, is fully explained in the last chapter, which embodies a detailed account of the events which led to the purchase of all the waste lands of the Forest of Essex, and their ultimate dedication to public use by the Corporation of London to remain unenclosed and unbuilt upon for ever. Mr. Fisher acted as counsel for the Corporation, and in this capacity had to examine an immense amount of documentary evidence, ancient and modern, which occupied him for four years. Having successfully enabled the Corporation to attain their object, it happily occurred to him that by the publication, in book-form, of the most material facts collected during this laborious research, he might place on record much that would be worth preserving, and much probably that could never again be collected once the documents in question were returned to their respective owners. As a result, we have in this volume a most interesting account of the ancient Forest of Essex, which was once so large as to cover the greater part of the county, but which has gradually been reduced to its present dimensions,—the fragment now known as Epping Forest. The full-page maps which are given, dated respectively 1225, 1292, 1301, 1641, and 1774, enable the reader to trace the successive alterations which were made in the forest bounderies.

As a lawyer, Mr. Fisher has naturally most to say on the forest-laws and their administration, and, incidentally, on ancient customs connected therewith. These do not here concern us so much as the remarks which follow on the *feræ naturæ* of the forest, past and present, the Wolf, the Boar, the Wild-deer (and the hounds that were used for hunting them), the Wild Cat, Marten, and Roe; the series of Goshawks and Sparrowhawks. On these and kindred topics Mr. Fisher discourses with the spirit of a naturalist, in which capacity he is no stranger to the readers of 'The Zoologist'; for do we not remember his 'Account of the Birds found in Norfolk,' written in conjunction with Mr. Gurney, and published many years ago in the pages of this Journal? It is pleasant now to find that, although the severer study of the law has so long occupied his close attention, it has not extinguished, but only interrupted, the prosecution of a taste for Natural History. His chapter on the Wild Animals of the Forest of Essex is both long (pp. 186—229) and interesting. The title is a little misleading, for he calls it "The Wild Deer"; and we are so accustomed to the use of the word "deer" in its restricted sense applying to the *Cervidæ*, that not until reading the chapter do we discover that Mr. Fisher employs it in its original and more extended sense applying to any wild animal. In this sense we have the Anglo-Saxon *deor*, Dutch *dier*, Danish *dyr*, Swedish *djur*, and German *thier* or *tier*.

Considering the former extent of this great forest, and the statements made by Fitzstephen in regard to the wild animals which inhabited it in the 12th century, we are surprised to learn (p. 189) that there are no entries about the Wolf in any of the records of the forest seen by the author. But that it was once common there is shown by the discovery of its remains during the construction of the reservoirs at Walthamstow; and there is satisfactory evidence of its presence in the forest and in other parts of the county during the historical period, though none of the time at which it became extinct.

The Wild Boar, says Mr. Fisher (p. 188), though a beast of the forest, was not usually considered to be a beast of venary. This last is a remarkable distinction. The Fox has in England always been held to be noxious, the Roe of inferior rank, and the Rabbit of little consequence; even the Hare has not always had the position given to it by Coke. But the Wild Boar was in Norman times one of the principal objects of the chase, and Coke says that his flesh is as much venison as that of the Deer. It must, however, be remembered that the laws of Canute refer to and probably embody laws still more ancient than themselves, and made at a time when both the Wolf and the Boar were too common and destructive to be the objects of preservation, or of the special care of the foresters.

The Red and Fallow Deer have for many centuries been the only representatives in the Forest of Essex of those larger beasts of chase which were the principal object of the Forest-laws, and of the care of the Forest officers. In the spring of 1884, however, a number of Roe-deer were introduced. These were captured in Dorsetshire, in the woods belonging to Mr. Mansel-Pleydell, of Whatcombe, and Col. Hamboro, of Milton Abbey, and, travelling all night from Dorsetshire into Essex, were liberated the following morning in Epping Forest. An interesting account of their capture and transport was published in 'The Field' of April 5th, 1884.

While on the subject of Deer we may note what Mr. Fisher says on the subject of "deer-leaps" (p. 217):—"The owners of enclosed parks in the Forest also made 'salteries' or 'deer-leaps'; contrivances by which the deer could easily leap into the park over a fence of moderate height, but were prevented from returning by a steep upward slope, and sometimes a ditch, inside the park-wall or fence. Four 'deer-leaps' in the pale of Wanstead Park, three being against Leyton Walk and the fourth against that of West Hainhault, were presented at the Court of 21st September, 1630; and the making of such leaps was the subject of one of the enquiries with which the Grand Jury were charged at the judgment seat."

The duties of the "Foresters" are explained in detail (p. 148), so also are those of the "Regardors' (p. 153). These continued to be exercised until 1817, when all the Forest offices were abolished by Act of Parliament passed in that year, from which date, until the disafforestation of Hainhault in 1851, and Epping in 1878, the duties of supervision and general management were vested at first in the First Commissioner of Woods and Forests, and afterwards in the Commissioner of Works and Public Buildings, without salary or fee. The disastrous effect of this change in the government of the royal forests as regards Epping is shown in subsequent chapters.

The Forest records contain but few notices of the hunting in it by royalty in person, but it is well known that from the time of Edward the Confessor, and probably much earlier, they frequented it for that purpose. The sovereigns mentioned by Mr. Fisher (p. 197) are Edward VI., Queen Elizabeth, and James I. He might have added Henry VIII., concerning whose hunting in Epping Forest there is an anecdote in Nott's 'Memoirs of the Earl of Surrey'; and Queen Mary, who, when princess in 1538, used to course with greyhounds in the forest of Waltham, as we learn from her 'Privy Purse Expenses,' edited by Sir Frederick Madden (p. 73).

The use of the word "buck" in place-names, such as Buckhurst Hill, raises an interesting question whether the Fallow-deer or the Roe originally suggested its application. From the circumstance that no fossil-remains of the Fallow-deer have been met with in England (while those of the Roe and Red-deer are common), it has been generally inferred that the Fallow-deer was not indigenous to this country, but was introduced by the Romans, but when and where for the first time there is no evidence to show. The dark-coloured variety of the Fallow-deer in Epping Forest is generally asserted to have been originally introduced there by James I., as stated in Bell's 'British Quadrupeds'; but, although James I. undoubtedly imported some Fallow-deer in 1612, which were turned out in Epping Forest and Enfield Chase, it has been conclusively shown

(Harting, Trans. Essex Nat. Field Club) that there were dark-coloured Fallow-deer in England long before that date, as early, in fact, as 1465.

The Wild Cat, or "Wood Cat," is mentioned in several of the ancient forest claims and grants. Edward Elrington and John Forest, lords of Theydon Hall, and others, claimed a right to hunt it in 1630 and 1670, though it is possible the animal referred to may have been the Marten, which was recognised as a beast of chase.

The name Hainhault is said (p. 15) to occur in the records for the first time in 1719–20, and is regarded as a comparatively modern corruption of a word variously written in the 13th and 14th centuries as "Hineholt" or "Hyneholt," in the 16th as "Inholt" or "Heinholt," and later as "Henault" or "Heynault." "The same name of 'Hyneholt,'" says Mr. Fisher, "was borne by part of the King's Wood at Colchester, in the 14th century; the Anglo-Saxon 'holt,' a wood, evidently forms the last syllable; of the first I can offer no satisfactory explanation" (p. 15). We take it that the first syllable is the Anglo-Saxon "Hean," signifying "high," and that the original spelling must have been "Heanholt." Compare in other counties the names "Heanor" and "Heanwood."

We have noted very few typographical errors in this work, showing the care with which it has been revised. On page 6, line 5, for *brooke* we should read *brocke*, i.e., the Badger, which was vermin in law, though it was reckoned a trespass to dig one out of another man's land without license (p. 187, note). In the footnote on p. 14, for *ancipitruum* we should read *accipitrum* "of Sparrowhawks"; on p. 26, for *Manduit* read *Mauduit*, i.e., the old form of *Maudit*; and for "blowing the *rechase*" (p. 167), the word *recheat* should be substituted. But slips such as these often escape the most experienced proof-reader, and, as we have said, they are comparatively few in number.

On the whole Mr. Fisher's work is full of interest, and if not, strictly speaking, a Natural History book, it at all events contains so many allusions to forest animals that our readers may be glad to have their attention directed to it.

The Solomon Islands and their Natives. By H. B. Guppy, M.B., F.G.S., late Surgeon R.N. H.M.S. 'Lark.'

The Solomon Islands: their Geology, General Features, and suitability for Colonisation. By the same Author. 2 vols., 8vo. London: Swan Sonnenschein & Co. 1887.

The most interesting feature in the history of the discovery of the Solomon Group, in the Pacific Ocean, is the circumstance that during a period of two hundred years after it was first discovered, in 1568, by the Spaniards, it was lost to the world, and its very existence doubted, until rediscovered by Carteret in 1767. The fancied existence of the precious metals suggested to Mendana, the original Spanish discoverer, the name "the Isles of Solomon," to the end that the Spaniards, supposing them to be the islands whence Solomon obtained his gold, might be induced to go and inhabit them. Various difficulties arising to postpone their colonisation, and in order to prevent the English from obtaining any knowledge of these islands, the publication of the official narrative of Mendana's voyage was purposely delayed. So strong a pressure was brought to bear upon Gallego, the chief pilot of the expedition, that he was afraid to publish his journal, which has not only remained *in manuscript* up to the present day, but was not brought to light until the second quarter of the present century. Thus it happened that for nearly half a century after the return of Mendana there was no account of the expedition, no chart preserved its discoveries, it being considered better, as things were then, to let these islands remain unknown.

The story of this lost archipelago is capitally told by Dr. Guppy in the twelfth chapter of his first volume, and reads almost like a novel. From a copy of the original MS. of Gallego's journal, preserved in the British Museum, Dr. Guppy has made a translation, which is now in great part printed by him. "In undertaking this translation," he says (p. 193), "I have been greatly assisted by my acquaintance with these islands, and I have thus been able to avoid the pit-falls into which the somewhat careless copyist might have led me."

During the last thirty years there has been greatly increased intercourse with the natives of these islands; the Melanesian Mission has firmly established itself; numerous traders have resided in the more friendly districts; and the visits of men-of-war and trading ships have been very frequent. Thus opportunities have been at length afforded to enterprising naturalists like Dr. Guppy to investigate the general features of the islands, and to learn something of the geology, fauna, and flora of this remote group.

We do not clearly appreciate the suggested advantage of presenting his work to the world in two not very thick volumes, when one would have sufficiently answered the purpose. But however this may be, the value of the work is not thereby impaired. In the volume first above quoted, besides the journal of Gallego and the narrative of the discovery of the islands above alluded to, we find the anthropology and ethnology of the group carefully treated, and illustrated with photographs; and, in addition, a detailed account of the fauna and flora. Passing over the "Botanical Notes" and "List of Plants" (pp. 280—307), we find chapters on the Reptiles and Batrachians (pp. 308—318), and Land and Fresh-water Shells (pp. 336—351), with useful lists of the species collected, the most interesting chapter, perhaps, in this volume being that headed "General Natural History Notes" (pp. 319—335). In this we have an account of the Cocoa-nut-eating Crab, *Birgus latro*, from which it appears that this curious crustacean feeds only on the fallen cocoa-nuts, and does not climb trees for them, as has been hastily asserted by some writers (p. 322). Then follows a description (p. 323) of the Nicobar Pigeon, so instrumental in transporting seeds from place to place. To this succeeds some notice of the "Bush-hen" (*Megapodius brenchleyi*), a familiar bird in these islands, which buries its eggs in the sand to a depth of between three and four feet.

"Edible Birds' Nests," "Millipedes," and "Hermit Crabs" are dealt with in turn, and the last chapter in this volume is on "Climate." It is said that the climate is damp and debilitating, the rainfall unusually heavy, and fever and ague prevalent on the coast; the dry season with north-west winds lasting from December to May.

In the second volume, which might well have been incorporated with the first, Dr. Guppy deals with the geology of these islands, which, it appears, are slowly rising, and traces of ancient upheaval are readily observable. Some of the smaller islands are of recent calcareous formation. Barrier and fringing reefs occur, as well as atolls. A comparatively shoal sea surrounds the archipelago, and, including the New Britain and Admiralty Islands, stretches to New Guinea, and thence to Australia, sufficiently accounting for the Papuan character of its fauna.

Dr. Guppy's narrative of his researches will awaken a new interest in this long-neglected group of islands, and encourage, as we may hope, the further investigation of its Zoology.

A Manual of Zoology for the Use of Students, with a General Introduction on the Principles of Zoology. By H. A. Nicholson, M.D., Regius Professor of Natural History in the University of Aberdeen. Seventh Edition, rewritten and enlarged, with numerous illustrations. 8vo. Edinburgh and London: Blackwood & Sons. 1887.

The appearance of a seventh edition of Professor Nicholson's 'Manual' testifies to its popularity, and to the continued demand for a comprehensive Introduction to the study of Zoology. To supply this in one volume of a portable size is by no means an easy task, nor is it possible where such a work is written by one hand to attain a uniform standard of excellence.

For beginners, as it seems to us, Prof. Nicholson has written too much, and for advanced students not enough. He probably flatters himself he has hit upon the happy mean, but this is a case where there ought not to be any middle course; the book should be one thing or the other, either an elementary manual or an advanced text-book.

With regard to the classification which he has adopted, opinions no doubt will differ, and Prof. Nicholson is assuredly entitled to his own; but in certain respects it strikes us as being not quite in harmony with the most recent views published by specialists.

One commendable feature should not be unnoticed—namely, the bibliographies which are printed at the end of each division of the work. But here again we regret our inability to bestow unqualified praise, and for this reason:—the works recommended are arranged neither alphabetically under authors' names, nor chronologically to enable the reader to trace the growth of literature on any given subject. The titles seem to have been written down at random: several of the works, from the way in which they are quoted, can scarcely have been seen by the compiler; and in several instances old editions are quoted instead of new and improved ones.

To take a very few examples in the literature relating to Vertebrates only, the following separate works and memoirs dealing with Mammalia find no place in Dr. Nicholson's list:—Flower, 'Osteology of the Mammalia' (3rd ed. 1885), and article "Mammalia" (Encycl. Brit. 9th ed. 1883); Dobson, 'Monograph of the Insectivora,' and 'Catalogue of Chiroptera in British Museum;' Bell, 'British Quadrupeds' (2nd ed. 1874); and Heilprin, 'Geographical Distribution of Animals.' No recent literature is referred to on the Cetacea; Gray's List of 1868 is quoted, but not that of Flower, 1885; nor the "Recent Memoirs on Cetacea"; nor the paper on the *Delphinidæ* (Proc. Zool. Soc. 1883). We look down the list in vain for something recent also on the *Monotremata*, though we must do Dr. Nicholson the justice to add that recent researches (*e. g.* those on *Ornithorhynchus* by Mr. Caldwell) are duly noticed in the body of the work (pp. 734, 735), although no reference is to be found in the list of works on Mammalia quoted on pages 872—875.

In regard to Ornithology, Prof. Newton's article "Birds" in the 'Encyclopædia Britannica,' 9th ed., is duly quoted, but not his equally important article "Ornithology" in the same work. The contributions of Prof. Selenka to Bronn's 'Thier-Reich' are noticed, but not those of Dr. Hans Gadow. The all-important Monographs of Gould, Sclater, Sharpe, Marshall, Shelley, Elliot, and Dresser are ignored; nor is there any allusion to such necessary works of reference as those of Baird, Brewer, Ridgway, Salvin and Godman, Tweeddale, and Legge. The 'Birds of New Guinea' are not alluded to, and the Humming Birds—notwithstanding the labours of Lesson and Elliot, and Gould's magnificent Monograph—are left entirely out in the cold. From Dr. Nicholson's list of "Bird-books" it would appear that the majority of ornithologists must have been for many years asleep.

This portion of Prof. Nicholson's 'Manual,' therefore, stands in need of revision to make it that useful adjunct which undoubtedly it would then be to a modern course of Zoology for students. The numerous illustrations with which the book is interspersed, although not equal in merit, add materially to its utility.

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